

Two New Species of the Family Chthoniidae from Kyushu, in Western Japan (Arachnida: Pseudoscorpionida)

Hiroshi SAKAYORI

Shimotsuma-Daini Senior High School, Shimotsuma, Ibaraki Pref., 304-0067 Japan

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Abstract Two new pseudoscorpion species, *Mundochthonius kiyoshii* sp. nov. and *Allochthonius kinkaiensis* sp. nov., are described from Kyushu, western Japan, belonging to the family Chthoniidae. They are characteristic in the proportion (length/breadth) of palpal femur and in chaetotaxies on carapace and tergites.

Key words: Pseudoscorpion, new species, *Mundochthonius*, *Allochthonius*, Kyushu, Japan

This paper describes two new species of the genus *Mundochthonius* and *Allochthonius*, both belonging to the family Chthoniidae, from Kinkai-cho, Nagasaki Prefecture, western Japan. Until now, five soil-dwelling species of the genus *Allochthonius* and two soil-dwelling subspecies of the species *Mundochthonius japonicus* have been reported from Japan; *A. opticus* (ELLINGSEN, 1907), *A. shintoisticus* CHAMBERLIN, 1929, *A. borealis* SATO, 1984, *A. tamurai* SAKAYORI, 1999, *A. montanus* SAKAYORI, 2000, *M. japonicus japonicus* CHAMBERLIN, 1929 and *M. j. scolytidis* MORIKAWA, 1954.

Mundochthonius kiyoshii sp. nov. (Figs. 1–11)

General characteristics similar to other soil-dwelling species of *Mundochthonius*, but smaller in size. Male and female very similar, though female a little larger in size and with slightly more robust palps than male.

Carapace (Figs. 1 and 2): Subquadrate, about as long as broad, considerably narrowing posteriorly; surface smooth dorsally, finely lined laterally; epistomal process subtriangular and irregularly serrate. Two eyes distinct. Carapacial chaetotaxy 6–4–4–2–2, 18.

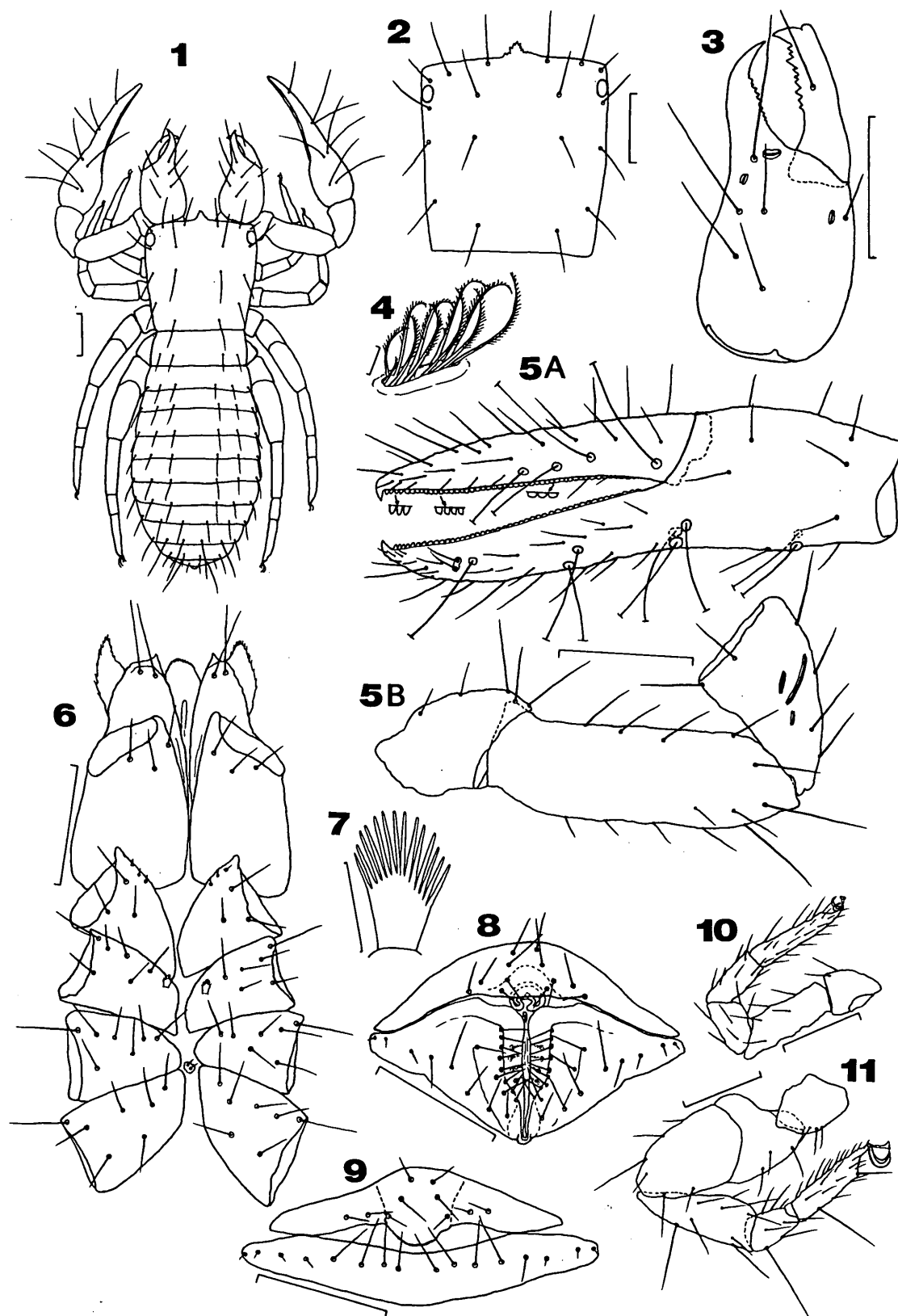
Coxal area (Fig. 6): Coxal area typical of the genus; one coxal spine (occasionally small additional spinules) present only on coxa II, consisting of a single, broad, flattened and deeply-incised blade (Fig. 7). Coxal chaetotaxy generally 2–2–1:mmm–2–1:2–3/1–cs:1–4/2:1–4/2. Bisetose, intercoxal tubercle present.

Abdomen (Fig. 1): Ovate; surfaces of tergites and sternites essentially smooth; pleural membranes covered with exceedingly fine papillae. Male tergal chaetotaxy 4 : 6 : 6 : 6 : 6 : 6 : 6 : 6 : 4 : 6 : 0 and sternal chaetotaxy 2/2/6/2:[4–4]:12–12/8–8 : 12 : 11 : 10 : 10 : 10 : 8 : 7 : 0 : 2, including microsetae. Female chaetotaxy similar to that of male except for sternites II to IV; 2/2/6 : 16 : 12 : 11 : 10 : 10 : 10 : 8 : 7 : 0 : 2. External genital areas (♂ and ♀) shown in Figs. 8 and 9, respectively.

Chelicera (Fig. 3): Distinctly shorter than carapace; palm of chelicera with 6 setae of which a minute one is located laterally. A galeal seta located on middle of movable finger. Palm nearly smooth, but basal part with squamous sculpture. Fixed and movable fingers with a row of 8–14 and 7–12 marginal teeth, respectively. Flagellum comprising a series of 10 or 11 plumose blades of which a posterior one is small (Fig. 4).

Pedipalp: Slender as shown in Figs. 5A and B. Trochanter 1.69–1.80 (♂) and 1.68–1.82 (♀), femur 3.29–3.44 (♂) and 3.27–3.55 (♀), tibia 1.58–1.68 (♂) and 1.52–1.65 (♀) times as long as broad, and chela 3.40–3.76 (♂) and 3.25–3.68 (♀) times as long as deep. Trichobothria as shown in Fig. 5A; fixed finger with eight of them and movable finger with four. In addition, subapical part of fixed finger with two sensory hairs. Fixed and movable fingers of chela with 36–45 and 38–43 teeth, respectively, along inner margin in both sexes.

Leg I and IV: As shown in Figs. 10 and 11, respectively. Leg IV with a long tactile seta on both metatarsus



Figs. 1-11. *Mundochthonius kiyoshii* sp. nov. 1. habitus; 2. carapace; 3. chelicera (serrulae omitted); 4. flagellum; 5. right pedipalp: A-chela, B-other segments; 6. coxal area; 7. coxal spine; 8. external genital area, male; 9. ditto, female; 10. right leg I; 11. right leg IV. Scale lines = 0.1 mm for Figs. 1-3, 5, 6, 8-11 and 0.01 mm for Figs. 4, 7.

and telotarsus.

Measurements (mm): Measurements of various structures, together with selected ratios, are given in Table 1.

Remarks. The present species resembles *M. japonicus japonicus*, *M. japonicus scolytidis* from Japan and *M. minusculus* from Korea (KIM and HONG, 1994), but distinctly differs from the former two subspecies by the chaetotaxy of tergites I–IV (in *japonicus*, 4–4–4–6 and in *scolytidis*, 4–4–6–6) and from the latter by the presence of two eyes (in *minusculus*, no eyes) and by the proportion of palpal femur (in *minusculus*, 2.57–3.19)

Type material. Holotype: male, taken from litter-rich A₀ layer of soil in a mixed forest of evergreen and deciduous trees at Ooishi, Muramatsugo, Kinkai-cho, Nagasaki Prefecture, Kyushu, 20 m alt., collected by K. ISHII, 23–V–1988. Allotype and paratypes 3 ♂, 3 ♀, same data as the holotype. Holotype (INM–1–008091), allotype (INM–1–008092) and two paratypes (♂ INM–1–008093, ♀ INM–1–008094) are deposited in the Ibaraki Nature Museum, Iwai, Ibaraki Pref., Japan, and the remaining paratypes, 2 ♂ and 2 ♀, are in my collection.

Other specimens examined: 4 ♂, 2 ♀ Akamizu, Nagaurago, Kinkai-cho, Nagasaki Pref., 150 m alt., 23–V–1988, K. ISHII leg.; 3 ♂, 3 ♀ Komatsudake, Hirayamago, Seihi-cho, Nagasaki Pref., 300 m alt., 23–V–1988, K. ISHII leg.

Etymology: This species is dedicated to Dr. Kiyoshi ISHII, a famous specialist of the millipedes.

Allochthonius kinkaiensis sp. nov.

(Figs. 12–22)

Male and female almost similar, though female a little larger in size and with slightly more robust palps than male.

Carapace (Figs. 12 and 14): Subquadrate, as long as broad, slightly narrowing posteriorly; epistomal process absent; with two pairs of conspicuous and vaulted eyes; chaetotaxy 10–4–6–2–4, 26, but occasionally lacking a dwarf seta in either lateral side of anterior margin, and rarely lacking one or two setae on median row.

Coxal area (Fig. 17): Tip of manducatory process with two setae, one being long and the other short. Coxal spines present only on coxae I, consisting of a tubercle expanded terminally into a spray of about six tridentate blades, in each blade a central spine distinctly spatulate (Fig. 18). Coxal chaetotaxy generally 2(one short and the

other long)–2–1 : cs–3–1 : 3–2 : 3–3 : 3–3. Bisetose, intercoxal tubercle present.

Abdomen (Fig. 12): Ovate; surfaces of tergites and sternites essentially smooth; pleural membranes covered with exceedingly fine papillae. Male tergal and sternal chaetotaxies 4 : 6 : 7 : 7 : 9 : 9 : 10 : 10 : 8 : 7 : 2 : 0 and 2/4/2 : [4–4] : 8–8/8–8 : 15 : 15 : 14 : 14 : 14 : 12 : 8 : 0 : 2, respectively. Female chaetotaxy similar to those of male except for sternites II and III; 2/2/2/4–20–15–15–14–14–14–12–8–0–2. External genital areas of male and female shown in Figs. 19 and 20, respectively.

Chelicera (Fig. 13): Distinctly shorter than carapace; palm of chelicera with 7 setae of which a minute one is located laterally. A galeal seta located on middle of movable finger; palm nearly smooth, but basal part with squamous sculpture. Fixed finger with 4 or 5 (rarely 3) conspicuous marginal teeth; movable finger with 13 to 18 fine denticulations. Flagellum comprising a series of 11 plumose blades of which a posterior one is small (Fig. 15).

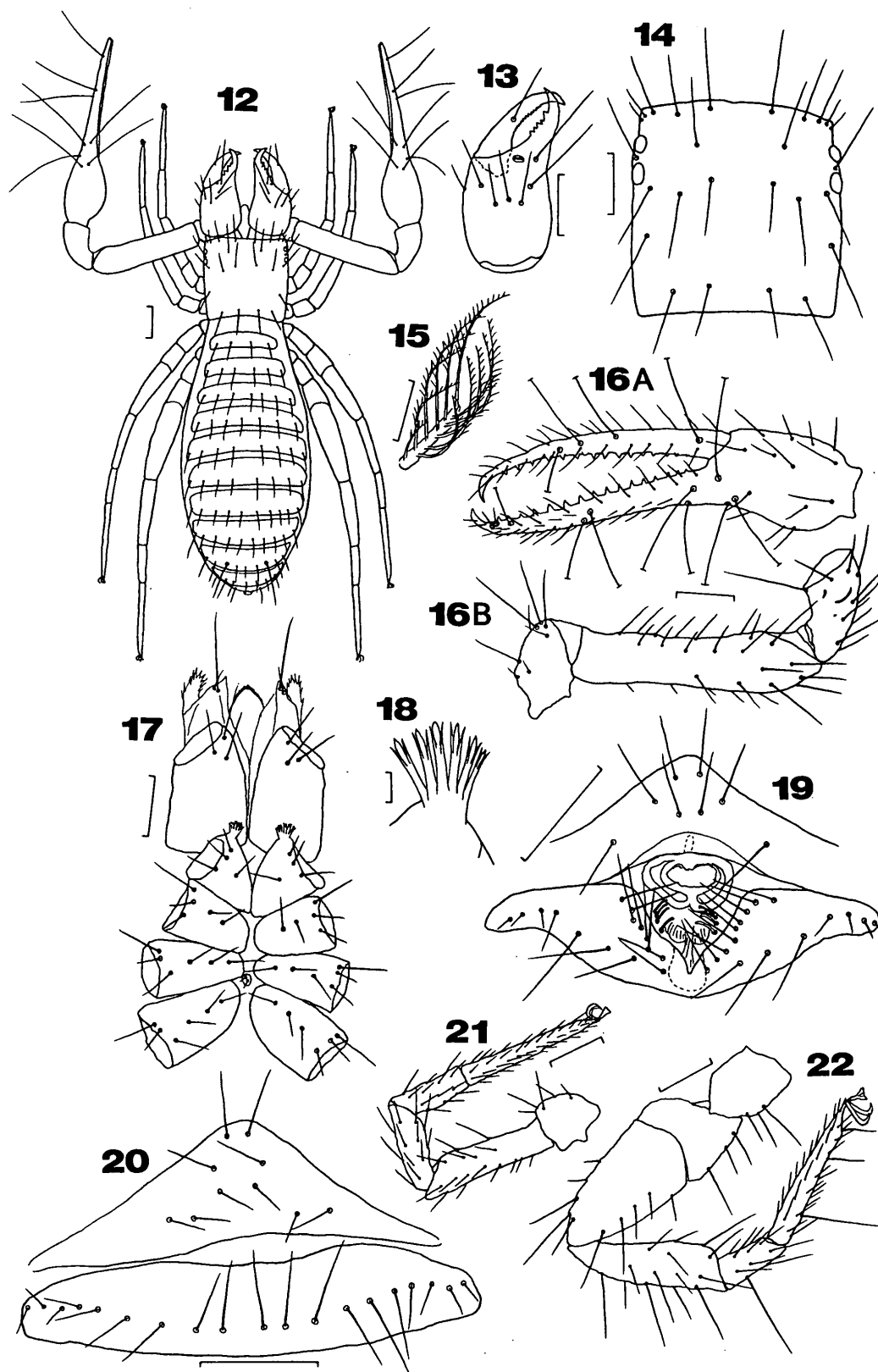
Pedipalp: Slender as shown in Figs. 16A and B. Trochanter 1.56–1.71 (♂) and 1.58–1.69 (♀), femur 4.13–4.36 (♂) and 4.03–4.28 (♀), tibia 1.91–2.09 (♂) and 1.79–2.03 (♀) times as long as broad, and chela 4.24–4.65 (♂) and 3.70–4.24 (♀) times as long as broad. Trichobothria as shown in Fig. 16A; fixed and movable fingers with eight of them and four, respectively. In addition, subapical part of fixed finger with two special sensory hair. Fixed and movable fingers of chela with 15–17 and 12–15 teeth, respectively, along inner margin in both sexes.

Leg I and IV: As shown in Figs. 21 and 22, respectively. Leg IV with a long tactile seta on both metatarsus and telotarsus.

Measurements (mm): Measurements of various structures, together with selected ratios, are given in Table 1.

Remarks. The present species resembles *A. tamurai*, but distinctly differs from it by the chaetotaxy of carapace (in *tamurai*, 10–4–4–2–4, 24), by the cheliceral palm with 7 setae (in *tamurai*, with 6 setae) and by the proportion (L./B.) of pedipalpal femur (in *tamurai*, 4.74–5.08 (♂) and 4.64–4.74 (♀)).

Type material. Holotype: male, taken from litter-rich A₀ layer of soil in a secondary mixed forest (evergreen and deciduous broad-leaved trees) at Akamizu, Nagaurago, Kinkai-cho, Nagasaki Prefecture, Kyushu, 150 m alt., collected by K. ISHII, 23–V–1988. Allotype



Figs. 12–22. *Allochthonius kinkaiensis* sp. nov. 12. habitus; 13. chelicera (serrulae omitted); 14. carapace; 15. flagellum; 16. pedipalp: A-chela, B-other segments; 17. coxal area; 18. coxal spine; 19. external genital area, male; 20. ditto, female; 21. right leg I; 22. right leg IV. Scale lines = 0.1 mm for Figs. 12–14, 16, 17, 19–22 and 0.01 mm for Figs. 15, 18.

Table 1. Measurements (mm) of various structures together with selected ratios for *Mundochthonius kiyoshii* sp. nov. and *Allochthonius kinkaiensis* sp. nov. (L: length, B: breadth, D: depth)

		<i>Mundochthonius kiyoshii</i>		<i>Allochthonius kinkaiensis</i>	
		male	female	male	female
Body L.		0.712-0.848	0.912-0.976	1.100-1.240	1.170-1.470
Carapace L.		0.260-0.304	0.280-0.328	0.304-0.379	0.363-0.391
anterior B.		0.241-0.276	0.272-0.292	0.320-0.359	0.367-0.446
L./anterior B.		1.01-1.22	1.00-1.14	0.95-1.13	0.87-1.02
Pedipalp					
Chela	total L.	0.332-0.363	0.359-0.387	0.604-0.653	0.652-0.748
	L. of palm	0.111-0.118	0.107-0.126	0.182-0.209	0.208-0.248
	L. of movable finger	0.213-0.245	0.225-0.259	0.395-0.434	0.436-0.520
	B. of palm	0.095-0.103	0.101-0.111	0.130-0.150	0.168-0.192
	D. of palm	0.099-0.103	0.103-0.114	0.138-0.154	0.172-0.200
	total L./B. of palm	3.40-3.76	3.25-3.68	4.24-4.65	3.70-4.24
Tibia	L.	0.135-0.145	0.133-0.149	0.178-0.197	0.201-0.233
	B.	0.082-0.087	0.084-0.097	0.091-0.101	0.101-0.114
	proportion L./B.	1.58-1.68	1.52-1.65	1.91-2.09	1.79-2.03
Femur	L.	0.223-0.234	0.230-0.251	0.393-0.446	0.442-0.489
	B.	0.065-0.070	0.065-0.074	0.095-0.107	0.109-0.118
	Proportion L./B.	3.29-3.44	3.27-3.55	4.13-4.36	4.03-4.28
Trochanter	L.	0.116-0.124	0.122-0.135	0.150-0.168	0.174-0.193
	B.	0.067-0.072	0.073-0.077	0.093-0.103	0.107-0.118
	Proportion L./B.	1.69-1.80	1.68-1.82	1.56-1.71	1.58-1.69
Chelicera total	L.	0.193-0.209	0.209-0.233	0.264-0.308	0.296-0.347
	B.	0.114-0.126	0.122-0.134	0.138-0.162	0.174-0.197
	L. of movable finger	0.114-0.126	0.124-0.138	0.150-0.186	0.193-0.221
Leg I					
Basifemur	L.	0.122-0.130	0.126-0.133	0.218-0.243	0.237-0.273
	B.	0.040-0.043	0.042-0.045	0.055-0.059	0.058-0.066
Telofemur	L.	0.067-0.075	0.072-0.079	0.140-0.159	0.151-0.171
	B.	0.041-0.043	0.043-0.045	0.049-0.055	0.053-0.061
Tibia	L.	0.079-0.082	0.084-0.090	0.126-0.137	0.131-0.153
	B.	0.030-0.033	0.031-0.033	0.039-0.044	0.043-0.049
Miotarsus	L.	0.120-0.143	0.136-0.151	0.230-0.259	0.263-0.290
	B.	0.026-0.027	0.027-0.029	0.033-0.037	0.037-0.039
Leg IV					
Basifemur	L.	0.112-0.120	0.120-0.131	0.149-0.169	0.159-0.179
	B.	0.101-0.115	0.104-0.118	0.133-0.157	0.141-0.165
Telofemur	L.	0.133-0.149	0.139-0.155	0.222-0.249	0.241-0.265
	B.	0.092-0.108	0.098-0.108	0.118-0.145	0.129-0.148
Tibia	L.	0.161-0.173	0.169-0.181	0.257-0.290	0.279-0.320
	B.	0.051-0.057	0.055-0.057	0.063-0.079	0.071-0.090
Metatarsus	L.	0.063-0.065	0.068-0.071	0.114-0.131	0.130-0.141
	B.	0.038-0.041	0.039-0.044	0.044-0.053	0.051-0.059
Telotarsus	L.	0.127-0.137	0.130-0.137	0.245-0.271	0.275-0.304
	B.	0.027-0.030	0.028-0.030	0.033-0.037	0.035-0.037

and paratypes 3 ♂, 3 ♀, same data as the holotype. Holotype (INM-1-008095), allotype (INM-1-008096) and two paratypes (♂ INM-1-008097, ♀ INM-1-008098) are deposited in the Ibaraki Nature Museum, Iwai, Ibaraki Pref., Japan, and the remaining paratypes, 2 ♂ and 2 ♀, are in my collection.

Other specimens examined: 4 ♂, 2 ♀ Ooishi,

Muramatsugo, Kinkai-cho, Nagasaki Pref., 20 m alt., 23-V-1988, K. ISHII leg.

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Table 2. Chaetotaxy of various structures and chelal teeth number for *Mundochthonius kiyoshii* sp. nov. and *Allochthonius kinkaiensis* sp. nov. [The figures in braces show its range]

	<i>Mundochthonius kiyoshii</i> sp. nov.	<i>Allochthonius kinkaiensis</i> sp. nov.
carapace	6-4-4-2-2, 18	10 9-10 -4-6 4-6 -2-4, 26 24-26
manducatory process and maxilla	2-2-1	2-2-1
coxa I	mmm-2-1	cs-3-1 0-1
II	2 2-3 -3 2-3 / 1 0-2 -cs	3-2
III	1-4 3-4 / 2 1-2	3 2-3 -3 3-4
IV	1-4 3-4 / 2 2-3	3-3 3-4
tergite I	4	4
II	6	6 6-7
III	6	7 6-8
IV	6	7 6-8
V	6	9 7-10
VI	6	9 8-10
VII	6	10 9-11
VIII	6	10 10-11
IX	6	8 8-9
X	4	7 6-8
XI	6	2
XII	0	0
sternite II	♂ 2/2/6 6-7 / 2 2-4 ♀ 2/2/6 5-6	♂ 2/4 3-4 / 2 ♀ 2/2/2/4
III	♂ 12 11-14 -12 10-13 8 8-10 -8 7-9 ♀ 16 16-17	♂ 8 6-9 -8 7-9 8 7-9 -8 7-9 ♀ 20 19-21
IV	12 12-14	15 13-17
V	11 10-12	15 12-17
VI	10 9-10	14 12-16
VII	10	14 12-15
VIII	10 9-10	14 13-15
IX	8	12 11-14
X	7	8 8-9
XI	0	0
XII	2	2
chelal trichobothria: fixed finger	8	8
movable finger	4	4
cheliceral palm	6	7 6-7
movable finger	1	1
blades of each coxal spine	1	6 5-7
number of flagellum	10 10-11	11
teeth no. of chelal fixed finger	40 36-45	16 15-17
movable finger	40 38-43	14 12-15

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摘 要

坂寄 廣 (茨城県立下妻第二高等学校 〒304-0067 茨城県下妻市下妻乙347-8) : 九州から採集されたツチカニムシ科の 2

新種について.

Edaphologia No. 69: 1-7, 2002.

長崎県琴海町の森林の落葉土壌層よりツチカニムシ科の 2 新種が発見されたので、それぞれ *Mundochthonius kiyoshii* sp. nov. (イシイカブツツチカニムシ, 新称), *Allochthonius kinkaiensis* sp. nov. (キンカイツチカニムシ, 新称) と命名して記載した。前者は, *M. japonicus* および *M. minusculus* に似るが, 腹部背板の毛序式が 4-6-6-6-6-6 である点で *M. japonicus* と異なり, 2 眼あることや触手腿節の長さとの比が 3.27-3.55 である点などで *M. minusculus* と異なる。後者は *A. tamurai* に似るが, 頭胸部の毛序式が 10-4-6-2-4,

26であること、鋏顎台に7毛が生えていることや触手腿節の長さ
と幅の比が雄で4.13–4.36、雌で4.03–4.28である点で異なる。

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